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Humanized Immunoglobulin Light Chain Variable Region

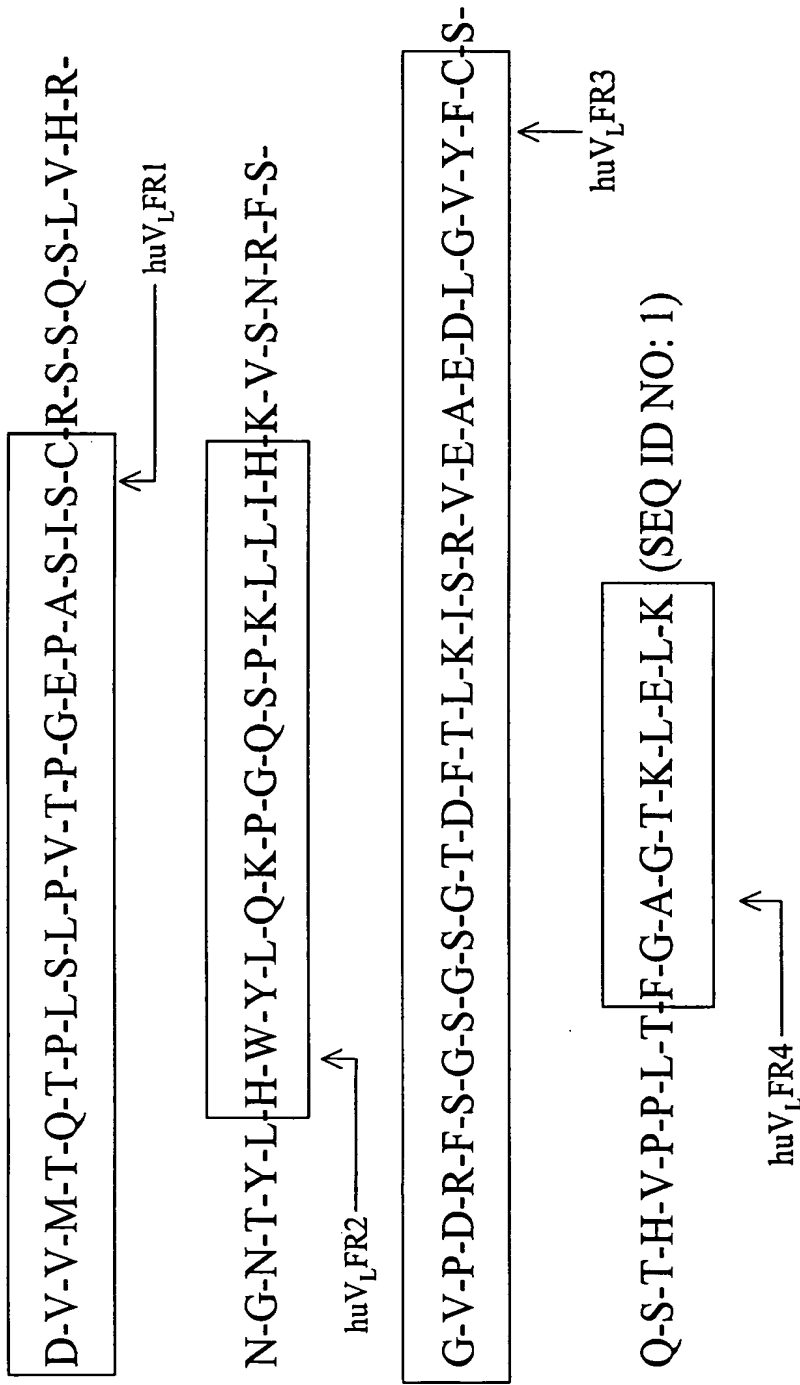


FIG. 1A

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Humanized Immunoglobulin Heavy Chain Variable Region

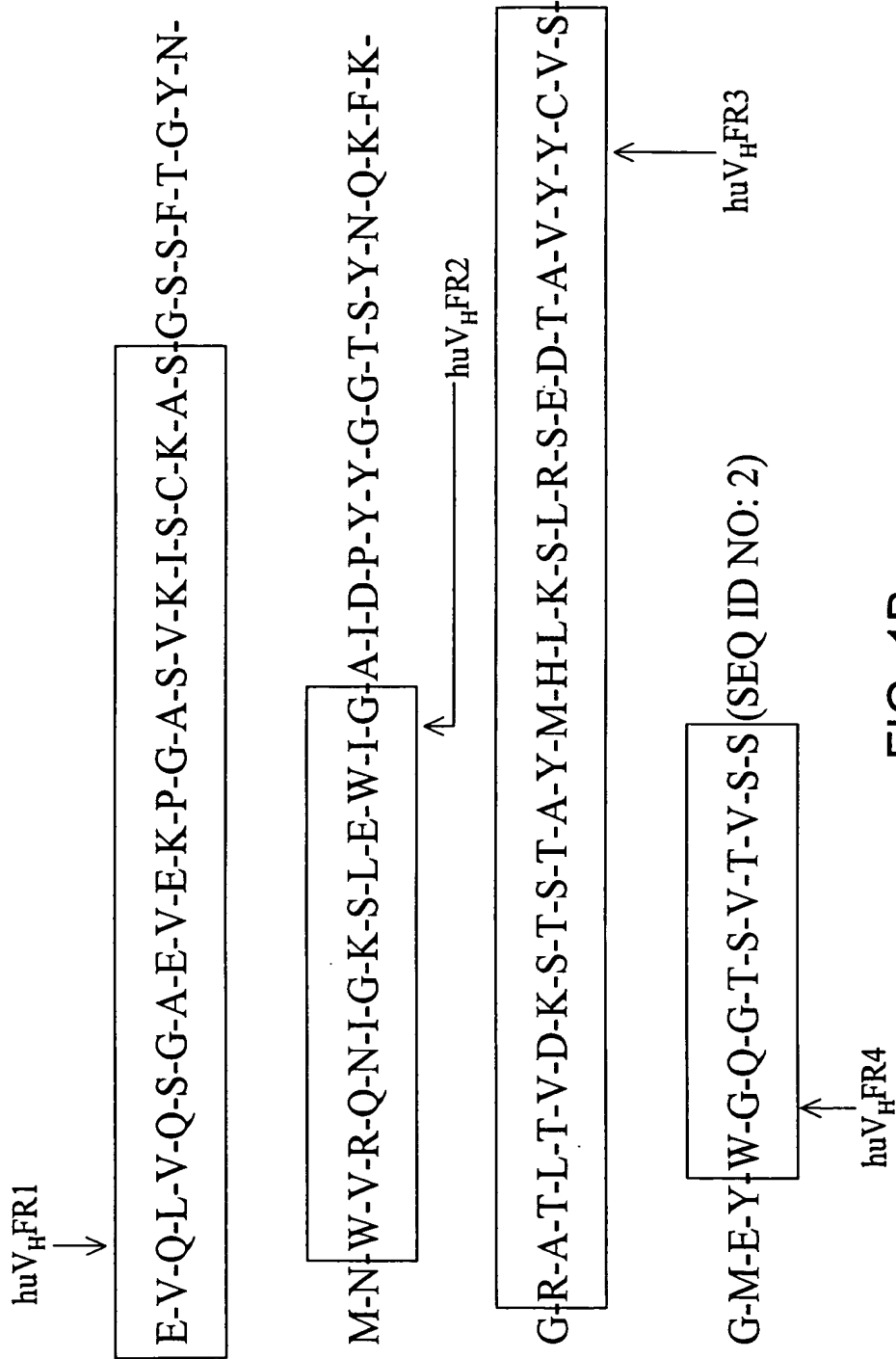


FIG. 1B

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Expression Vector Nucleotide Sequence

GTCGACATTGATTATTGACTAGTTATTAATAGTAATCAATTACGGGGTCATTAGTTCATAGCCCCAT
ATATGGAGTTCGCGTTACATAACTTACGGTAAATGGCCCGCTGGCTGACCGCCCAACGACCCCC
GCCCATTGACGTCAATAATGACGTATGTTCCCATAGTAACGCCAATAGGGACTTTCCATTGACGTC
AATGGGTGGAGTATTTACGGTAAACTGCCCACTTGGCAGTACATCAAGTGTATCATATGCCAAGTA
CGCCCCCTATTGACGTCAATGACGGTAAATGGCCCGCTGGCATTATGCCCAGTACATGACCTTAT
GGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTCAATCGCTATTACCATGGTGATGCGGTTTGG
GCAGTACATCAATGGGCGTGATAGCGGTTTGACTCACGGGGATTTCCAAAGTCTCCACCCCATTTGA
CGTCAAATGGGAGTTTGTTTTGGCACCAAATAACAACGGGACTTTCCAAAAATGTCGTAAACAACCTCCG
CCCATTGACGCAAAATGGGCGGTAGGCGGTACGGTGGGAGGTCTATATAAGCAGAGCTCTCTGGC
TAACTACAGAAACCACTGCTTAACCTGGCTTATCGAAATTAATACGACTCACTATAGGGAGACCCCTC
TAGAATGAAGTTGCCTGTAGGCTGTTGGTGCTGATGTTCTGGATTCTCTGGTGGAGAGAGGGGAA
GTGAGGGAGGAGAAATGGACAGGGAGCAGGAGCACTGAATCCCAATGCTCATTCCTATCTGCTGGC
ATGGGTGAGAAAGATGGGTCTTATCCTCCAGCATGGGGCTCTGGGTGAATACTTGTTAGAGGGA
GGTCCAGATGGGAACATGTGCTATAATGAAGATTATGAAATGGATGCCTGGGATGGTCTAAGTA
ATGCCTTAGAAGTGACTAGACACTTGCAATTTCACCTTTTGTGGTAAGAAGAGATTTTATAGGCTATA
AAAAATGTTATGTAAAAATAAACGATCACAGTTGAAATAAAAAATAAAGGATGTTTCATG
AATTTTGTGTATAACTATGTATTTCTCTCTCAATTGTTTCAGCTTCCCTTAAGCGACGTGTGATGACC
CAGACCCCCCTGTCCCTGCCCGTGACCCCCGGCGAGCCCCCTCCATCTCCTGCAGATCTAGTCAG
AGTCTTGACACCGTAATGGAAACACCTATTACATTGTAACCTGCAGAAAGCCAGCCAGTCTCCA
AAGCTCCTGATTCACAAAGTTTCCAAACCGATTTTCTGGGTCCCAAGACAGGTTCAAGTGGCAGTGGA
TCAGGGACAGATTTACACTCAAGATCAGCAGAGTGGAGGCTGAGGATCTGGGAGTTTATTTCTGT
TCTCAAAGTACACATGTTCTCCGCTCACGTTCCGGTGTGGGACCAAGCTGGAGCTGAACGTAATT
AGTGTGTCAGGGTTTCACAAGAGGGACTAAAGACATGTCAGCTATGTGTGACTAATGTAATGTC

FIG. 2A

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ACTAAGCTGCGGATCCCGCAATTCTAACTCTGAGGGGTCGGATGACGTGGCCATTCTTTGCCT
AAAGCATTGAGTTTACTGCAAGGTCAGAAAGCATGCAAGCCCTCAGAAATGGCTGCAAGAGCT
CCAACAAAACAATTAGAACTTTATTAAGGAATAGGGGAAGCTAGGAAGAAACTCAAAACATCA
AGATTTTAAATACGCTTCTTGGTCTCCTTGCTATAATTATCTGGGATAAGCATGCTGTTTCTGTCT
GTCCCTAACATGCCCTGTGATTATCCGCAAAACAACACACCCAGGCGAGAACTTTGTTACTTAAAC
ACCATCCTGTTTGCTTCTTCCCTCAGGAACTGTGGCTGCACCATCTGTCTTCATCTTCCCGCCATCTG
ATGAGCAGTTGAAATCTGGAACCTGCTCTGTTGTGCTGCTGAATAACTTCTATCCCAGAGAGG
CCAAAGTACAGTGAAGGTGGATAACGCCCTCCAATCGGGTAACCTCCAGGAGAGTGTACAGAG
CAGGACAGCAAGGACAGCACCTACAGCCTCAGCAGCACCCCTGACGCTGAGCAAAAGCAGACTACG
AGAAACACAAGTCTACGCCCTGCGAAGTCAACCATCAGGGCTGAGCTCGCCCGTCAACAAGAGC
TTCAACAGGGGAGAGTGTTAGAGGGAGAAAGTGCCCCACCTGCTCCTCAGTTCAGCCTGACCCCC
TCCCATCCTTTGGCCTCTGACCCCTTTTCCACAGGGACCTACCCCTATTGCGGTCTCCAGCTCAT
CTTTCACCTCACCCCCCTCCTCCTCTGCTTAAATTAATGCTAATGTTGAGGAGAAATGAATAAT
AAAGTGAAATCTTTGCACCTGTGGTTTCTCTCTTCCCTCAATTAATAATTAATCTGTTGTTACCA
ACTACTCAATTTCTCTTAAGGGACTAAATATGAGTCACTCCTAAGGCGCATAAACCATTTATAAA
AATCATCCTTCATTTCTATTTACCTATCATCTCTGCAAGACAGTCCCTCCCTCAAAACCCACAAGCC
TTCTGTCCCTCACAGTCCCTGGGCCATGGTAGGAGAGACTTGCTTCTGTTTTTCCCTCCTCAGCA
AGCCCTCATAGTCCCTTTTAAGGGTGACAGGCTTACGGTCATATATCCTTTGATTCAATTCCCTGG
GAATCAACCAAGGCAAAATTTTCAAAAGAAAGAAACCTGCTATAAAGAGAAATCAATTGCAACA
TGATATAAAATAACACACAATAAAAGCAATTAATAACAAACAATAGGGAAATGTTTAAGTTC
ATCATGGTACTTAGACTTAATGGAAATGTGATGCTTATTTACATTTTAAACAGGTACTGAGGGAC
TCCTGTCTGCCAAGGCCGTATTGAGTACTTTCCACAACCTAATTAATCCACACTATACTGTGAG
ATTAAACATTCAATAAATGTTGCAAGGTTCTATAAGCTGAGAGACAAATATAATCTATAAC
TCAGCAATCCCACTTCTAGGGTCGATCGACGTTGACATTGATTATTGACTAGTTAATAATAGTAATC
AATTACGGGTCAATTAGTTCATAGCCCATATATGGAGTCCGCGTTACATAACTTACGGTAAATGG
CCCGCTGGCTGACCGCCCAACGACCCCCGCCCATTGACGTCATAATGACGTAATGTTCCCATAGT
AACGCCAATAGGGACTTTCCATTGACGTCAATGGGTGGAGTATTACGGTAACACTGCCCACTTGGC
AGTACATCAAGTGTATCATATGCCAAGTACGCCCCCTATTGACGTCATGACGGTAAATGGCCCCG

FIG. 2B

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CTGGCATTATGCCAGTACATGACCTTATGGGACTTTCCTACTTGGCAGTACATCTACGTATTAGTC
ATCGCTATTACCATGTGTATGCGGTTTTGGCAGTACATCAATGGCGTGGATAGCGGTTTGACTCA
CGGGGATTTCCAAGTCTCCACCCCAATTGACGTCAATGGGAGTTTGTTTTGGCACCAAAATCAACGG
GACTTTCCAAAATGTGCTAACAACTCCGCCCAATTGACGCCAAATGGCGGTAGCGGTGTACGGTG
GGAGGTCTATATAAGCAGAGCTCTCTGGCTAACTACAGAACCCACTGCTTAACTGGCTTATCGAAA
TTAATACGACTACTATAGGGAGACCCAAAGCTCCTCGAGGCTAGAAATGAAGTTGCCCTGTAGGCTG
TTGGTGTGATGTTCTGGATTCTCTGGTGAAGAGAGAGGGAAGTGAGGAGGAGAAATGGACAGGGA
GCAGGAGCACTGAATCCCATTTGCTCATTCCTATGTATCTGGCATGGGTGAGAAAGATGGGTCTTATCC
TCCAGCATGGGCGCTCTGGGTGAATACTTGTAGAGGAGGTTCCAGATGGGAACATGTGCTAT
AATGAAGATTATGAAATGGATGCCCTGGGATGGTCTAAGTAATGCCCTTAGAAGTGACTAGACACTT
GCAATTCACTTTTTTTGTAGAGAGAGATTTTTAGGCTATAAAATAATGTTATGTAAATAAACA
ATCACAGTTGAAATAAAAAAATAAAGATGTTTCAATGAATTTTGTGTATAACTATGTATTTCT
CTCTCATTTGTTTCAGCTTTCCTTAAGCGAGGTGCAAGCTGGTGCAAGTCCGCGCGGAGGTGGAGAAC
CCGGCGCTCCGTGAAGATCTCCTGCAAGGCCCTCCGGCTCCTCCTTCAACCGGCTACAACATGAAC
GGGTGCGCCAGAACATCGGCAAGTCCCTGGAGTGGATCGGCGCCATCGACCCCTACTACGGCGGC
ACCTCCTACAACCAAGTTCAAGGGCCGCGCACCCCTGACCGTGGACAAGTCCACCTCCACCCGC
CTACATGCACCTGAAGTCCCTGCGCTCCGAGGACACCGCCGTGTACTACTGCGTGTCCGGCATGGA
GTACTGGGGCCAGGGCACCTCCGTGACCGTGTCTCCGGTAAGCTTTTCTGGGCGAGGCCAGGCCT
GACCTTGGCTTTGGGCGAGGGAGGGGCTAAGGTGAGGCAGGTGGCGCCAGCCAGGTGCACACCC
AATGCCCATGAGCCAGACACTGACGCTGAACCTCGCGGACAGTTAAGAACCCAGGGGCCCTCTG
CGCCCTGGGCCCCAGCTCTGTCCACACCGCGGTCAATGGACCAACCTCTCTTTCAGCCCTCCACCA
AGGGCCCATCGGTCTTCCCCCTGGCACCCCTCCTCCAAGAGCACCTCTGGGGGCACAGCGGCCCTGG
GCTGCCCTGGTCAAGGACTACTTCCCCGAACCGGTGACGGTGTCTGTGGAACCTCAGGCGCCCTGACCA
GCGGCGTGACACACCTTCCCGGCTGTCTACAGTCCCTCAGGACTCTACTCCCTCAGCAGCGGTGTTGA

FIG. 2C

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CCGTGCCCTCCAGCAGCTTGGGCACCCAGACCTACATCTGCAACGTGAATCACAAGCCCCAGCAAC
ACCAAGGTGGACAAAGAGAGTTGGTGAGAGGCCAGCACAGGAGGGAGGGTGTCTGTCTGGAAGCC
AGGCTCAGCGCTCCTGCTGACGCAATCCCGGCTATGCAGTCCAGTCCAGGGCAGCAAGGCAGG
CCCCGTCTGCCCTTCAACCCGAGGCCTCTGCCCGCCCACTCATGCTCAGGGAGAGGGTCTTCTG
GCTTTTCCCCAGGCTCTGGGCAGGCACAGGCTAGGTGCCCTAACCCAGGCCCTGCACACAAGG
GGCAGGTGCTGGGCTCAGACCTGCCAAGAGCCATATCCGGGAGGACCTGCCCTGACCTAAGCC
CACCCAAAGGCCAAACTCTCCACTCCCTCAGCTCGGACACCTTCTCTCTCTCCAGATTCCAGTAA
CTCCCAATCTTCTCTGCAGAGCCCAAATCTTGTGACAAAACTCACACATGCCCAACCGTGCCAG
GTAAGCCAGCCAGGCTCGCCCTCCAGCTCAAGCGGGACAGGTGCCCTAGAGTAGCCTGCATC
CAGGACAGCCCCAGCCGGGTGCTGACACGTCCACCTCCATCTCTTCTCAGCACCTGAACCTCCT
GGGGGACCGTCAGTCTTCCCTCTTCCCCCAAAACCCCAAGGACACCCCTCATGATCTCCCGGACCCC
TGAGGTCACATGCGTGGTGACGTGAGCCACGAAGACCTGAGGTCAAGTTCAACTGGTAGC
TGACGGCGTGAGGTGCATAATGCCAAGACAAAGCCGCGGAGGAGCAGTACAACAGCACGTA
CCGTGTGTCAGGTCCTCACCCTCTGCACAGGACTGGCTGAATGGCAAGGAGTACAAGTGCA
AGGTCTCCAAACAAGCCCTCCAGCCCCCATCGAGAAACCATCTCCAAAGCCAAAGGTGGGACC
CGTGGGTGCGAGGGCCACATGGACAGAGGCGGCTCGGCCCCACCTCTGCCCTGAGAGTGACCG
CTGTACCAACCTCTGTCCCTACAGGCAGCCCGAGAACCAAGGTGTACACCCCTGCCCCCATCAC
GGAGGAGATGACCAAGAACAGGTACGCTGACCTGCTGGTCAAAGGCTTCTATCCCAGCGAC
ATCGCCGTGGAGTGAGACAAATGGGAGCGCGAGAACAACTACAAGACCAAGCCCTCCCGTGCT
GGACTCCGACGGCTCCTTCTCTCTATAGCAAGCTCACCCGTGGACAAGAGCAGGTGGCAGCAGG
GGAACGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGCACAACCACTACACGCAGAAAGACCTCT
CCCTGTCCCCGGTAAAGCCCCCACTTCAAGTTCTACAAAGAAACACAGCTGCAACTGGAGCAT
CTCCTGTGGATCTCCAGATGATTCTGAAATGGAAATTAACAACCTACAAGATCCCAAACTCACCCAGG
ATGCTCACATTCAAGTTCTACATGCCCAAGAGGCCACAGAGCTCAAAACATCTCCAGTGTCTAGAG
GAGGAACCTCAACCTCTGGAGGAAGTGCTAAACCTCGCTCAGAGCAAAACCTTCCACTTAAGACC
TAGGGACTTAATCAGCAATATCAACGTAATAGTTCTGGAACTAAAGGGATCCGAAACAACATTCA
TGTGTGAATATGCTGATGAGACAGCAACCAATTGTAGAAATTTCTGAACAGATGGATTACCTTTTGTG

FIG. 2D

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AAAGCATCATCTCAACACTAACTTGATAATTAAGTGCTCGAGGGATCCAGACATGATAAGATACA
TTGATGAGTTTGGACAAACCACAACACTAGAAATGCAGTGAAAAAATGCTTTATTTGTGAAATTTGTG
ATGCTATTGCTTTATTGTAAACCATTAGAAGCTGCAATAAACAAAGTTAAACAACAATTGCATTC
ATTTTATGTTTCAGGTTTCAGGGGGAGGTGTGGAGGTTTTTTTAAAGCAAGTAAACCTCTACAAAT
GTGGTATGGCTGATTATGATCCTGCCTCGCGGTTTTCGGTGATGACGGTGAAACCTCTGACACAT
GCAGTCCCGGAGACGGTCACAGCTTGCTGTAAAGCGGATGCCGGGAGCAGACAAGCCCGTCAGG
GCGGTCAGCGGGTGTGGCGGTGTGCGGGCGCAGCCATGACCCAGTCACGTACGTAGCGATAGCGGA
GTGTATACTGGCTTAACATATGCGGCATCAGAGCAGATTGTACTGAGAGTGCACCATATGCGGTGTG
AAATACCGCACAGATGCGTAAGGAGAAAAATACCGCATCAGCGCTCTTCGGCTTCCTCGCTCACTG
ACTCGCTGCGCTCGTTCGGTTCGGCTGCGCGGAGCGGTATCAGCTCACTCAAAGGCGGTAATACGGT
TATCCACAGAAATCAGGGGATAACGCAGGAAAGAACATGTGAGCAAAGGCCAGCAAAGGCCAG
GAACCGTAAAAAGGCCGCTTGCTGGCGTTTTTCCATAGGCTCCGCCCCCTGACGAGCATCACAA
AAATCGACGCTCAAGTCAGAGGTGGCGAAACCCGACAGGACTATAAGATACCGCGTTTCCCC
CTGGAAGCTCCCTCGTGCCTCTCCTGTTCGACCCCTGCCGCTTACCGGATACCTGTCCGCTTCT
CCCTTCGGGAAGCGTGGCGCTTTCTCAATGCTCAGCTGTAGGTATCTCAGTTCGGTGTAGGTCGTT
CGCTCCAAAGCTGGGCTGTGTGCACGAACCCCGCTTCAGCCCGACCGCTGCGCTTATCCGGTAAC
TATCGTCTTGAGTCCAAACCCGTAAGACACGACTTATCGCCACTGGCAGCAGCCACTGGTAACAGG
ATTAGCAGAGCGAGGTATGTAGCGGTGCTACAGAGTTCTTGAAGTGGTGGCCTAACTACGGCTA
CACTAGAAGGACAGTATTTGGTATCTGCGCTCTGCTGAAGCCAGTTACCTTCGGAAAAAGAGTTGG
TAGCTCTTGATCCGGCAACAACCAACCGCTGTGAGCGGTGTTTTTTTGTGCAAGCAGCAGAT
TACCGGCAGAAAAAAGGATCTCAAGAAGATCCTTTGATCTTTTCTACGGGGTGTGACGCTCAGTG
GAACGAAACTCACGTTAAGGGATTTTGGTCAATGAGATTATCAAAAAAGGATCTTCACCTAGATCCT

FIG. 2E

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TTTAAATTAAATGAAGTTTTTAAATCAATCTAAAGTATATATGAGTAAACTTGGTCTGACAGTTA
CCAATGCTTAATCAGTAGGCACCTATCTCAGCATCTGTCTATTTCTGTTCAATCCATAGTTGCCCTGA
CTCCCCGTCTGTAGATAACTACGATACGGGAGGGCTTACCACTCTGGCCCCAGTGTGCAATGATA
CCGCGAGACCCACGCTCACCGGCTCCAGATTTATCAGCAATAAACCCAGCCAGCCGGAAGGGCCGA
GCGCAGAAGTGGTCTGCAACTTTATCCGCCCTCCATCCAGTCTATTAATTGTTGCCGGGAAGCTAG
AGTAAGTAGTTCGCCAGTTAATAGTTTGCGCAACGTTGTTGCCATTGCTGCAGGCATCGTGGTGTC
ACGCTCGTCTTGGTATGGCTTTCATTCAGCTCCGGTTCCCAACGATCAAGCGGAGTTACATGATC
CCCCATGTTGTGCAAAAAGCGGTTAGCTCCTTCGGTCTCCGATCGTTGTCAGAAAGTAAGTTGGC
CGCAGTGTATCACTCATGGTTATGGCAGCACTGCATAATTCTCTTACTGTCTATGCCATCCGTAAGA
TGCTTTTCTGTGACTGGTAGTACTCAACCAAGTCATTTCTGAGATAAGTGTATGCGGCGACCGAGT
TGCTCTTGCCCGGCTCAACACGGGATAATACCGCGCCACATAGCAGAACTTTAAAGTGCTCATC
ATTGGAACACGTTCTTCGGGGCGAAACTCTCAAGGATCTTACCGCTGTTGAGATCCAGTTCGATG
TAACCCACTCGTGCAACCACTGATCTTCAGCATCTTTTACTTTCACCCAGCGTTTCTGGGTGAGCAA
AAACAGGAAGGCAAAATGCCGCAAAAAGGGAAATAAGGGCGACACGGAAAATGTTGAATACTCAT
ACTCTTCCTTTTCAATATTAATTGAAGCATTTATCAGGGTTATTGTCTCATGAGCGGATACATATTT
GAATGTATTTAGAAAATAAACAAAATAGGGGTTCCGGCGACATTTCCCGGAAAAGTGCCACCTGA
CGTCTAAGAAACCATTTATCATGACATTAACCTATAAAATAGGCGTATCACGAGGCCCTTTTCG
TCTTCAAGAAATCCGATCCAGACATGATAAGATACATTTGATGAGTTGGACAAACCCAACTAGA
ATGCAGTGAAAAAATGCTTTTATTTGTGAAATTTGTGATGCTATTGCTTTATTGTAAACCATTAGAA
GCTGCAATAAACAAAGTTAACAAACAATTGCAATTCATTTTATGTTTCAGGTTTCAGGGGAGGTGT
GGGAGGTTTTTTTAAAGCAAGTAAACCTCTACAAATGTGATGCTGATTAATGATCTAAAGCCAG
CAAAAGTCCCATGGTCTTATAAAATGCATAGCTTTTCGGAGGGAGCAGAGAACTTGAAAGCATC
TTCCTGTTAGTCTTCTCTCGTAGACCTTAAATTCATACTTGATTCCTTTTTCCTCTGGACCTCAG
AGAGGACGCTGGGTATTTCTGGGAGAAAGTTTATAATTTCCCCAAATCAATTTCTGGGAAAACGTTGT
CACTTTCAAAATTCCTGCATGATCCTTGTCAAAAGAGTCTGAGTGCCCTGGTTGATTCATGGCTTC
CTGGTAAACAGAACTGCCTCCGACTATCCAAACCATGTCTACTTTACTTGCCAAATTCGGGTTGTTC
ATAAGTCTTAAGGCATCATCCAAACTTTTGGCAAGAAAATGAGCTCCTCGTGTGTTCTTTGAGT
TCTCTACTGAGAACTATATTAATTCTGTCTCTTTAAAGGTCGATTCTTCTCAGGAAATGGAGAACCCAG

FIG. 2F

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GTTTTCTACCCATAATCACCAGATTCTGTTTACCTTCCACTGAAGAGTTGTGGTCAATTCCTTTGGA
AGTACTTGAACTCGTTCCTGAGCGGAGGCCAGGGTCGGTCTCCGTTCCTTGCCAAATCCCCATATTTTG
GGACACGGCGACGATGCAGTTCAATGGTCGAACCATGAGGGCACCAAGCTAGCTTTTGTGCAAAAG
CCTAGGCTCCAAAAGCCTCCTCACTACTTCTGGAATAGCTCAGAGGCCGAGGGCCCTCGGCC
TCTGCATAATAAAATAAAATTAGTCAGCCATGGGGCGGAGAAATGGCGGAACTGGCGGAGTTAG
GGCGGGATGGCGGAGTTAGGGCGGGAATAAGTTGCTGACTAATTGAGATGCATGCTTTGCA
TACTTCTGCCTGCTGGGAGCCTGGGGACTTTCCACACCTGGTTGCTGACTAATTGAGATGCATGC
TTTGCACTACTTCTGCCTGCTGGGAGCCTGGGGACTTTCCACACCCCTAACTGACACACATTCCACA
(SEQ ID NO: 4)

FIG. 2G

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Humanized Immunoglobulin Light Chain

D-V-V-M-T-Q-T-P-L-S-L-P-V-T-P-G-E-P-A-S-I-S-C-R-S-S-Q-S-L-V-H-R-N-G-N-T-Y-

L-H-W-Y-L-Q-K-P-G-Q-S-P-K-L-L-I-H-K-V-S-N-R-F-S-G-V-P-D-R-F-S-G-S-G-S-G-T-

D-F-T-L-K-I-S-R-V-E-A-E-D-L-G-V-Y-F-C-S-Q-S-T-H-V-P-P-L-T-F-G-A-G-T-K-L-E-

L-K-R-T-V-A-A-P-S-V-F-I-F-P-P-S-D-E-Q-L-K-S-G-T-A-S-V-V-C-L-L-N-N-F-Y-P-R-

E-A-K-V-Q-W-K-V-D-N-A-L-Q-S-G-N-S-Q-E-S-V-T-E-Q-D-S-K-D-S-T-Y-S-L-S-S-T-

L-T-L-S-K-A-D-Y-E-K-H-K-V-Y-A-C-E-V-T-H-Q-G-L-S-S-P-V-T-K-S-F-N-R-G-E-C

(SEQ ID NO: 5)

FIG. 3A

Humanized Immunoglobulin Heavy Chain-IL-2

E-V-Q-L-V-Q-S-G-A-E-V-E-K-P-G-A-S-V-K-I-S-C-K-A-S-G-S-S-F-T-G-Y-N-M-N-W-V-R-Q-N-I-G-K-S-L-E-W-I-G-
A-I-D-P-Y-Y-G-G-T-S-Y-N-Q-K-F-K-G-R-A-T-L-T-V-D-K-S-T-S-T-A-Y-M-H-L-K-S-L-R-S-E-D-T-A-V-Y-Y-C-V-S-
G-M-E-Y-W-G-Q-G-T-S-V-T-V-S-S-A-S-T-K-G-P-S-V-F-P-L-A-P-S-S-K-S-T-S-G-G-T-A-A-L-G-C-L-V-K-D-Y-F-P-
E-P-V-T-V-S-W-N-S-G-A-L-T-S-G-V-H-T-F-P-A-V-L-Q-S-S-G-L-Y-S-L-S-S-V-V-T-V-P-S-S-S-L-G-T-Q-T-Y-I-C-N-
V-N-H-K-P-S-N-T-K-V-D-K-R-V-E-P-K-S-C-D-K-T-H-T-C-P-P-C-P-A-P-E-L-L-G-G-P-S-V-F-L-F-P-P-K-P-K-D-T-L-
M-I-S-R-T-P-E-V-T-C-V-V-D-V-S-H-E-D-P-E-V-K-F-N-W-Y-V-D-G-V-E-V-H-N-A-K-T-K-P-R-E-E-Q-Y-N-S-T-Y-
R-V-V-S-V-L-T-V-L-H-Q-D-W-L-N-G-K-E-Y-K-C-K-V-S-N-K-A-L-P-A-P-I-E-K-T-I-S-K-A-K-G-Q-P-R-E-P-Q-V-Y-
T-L-P-P-S-R-E-E-M-T-K-N-Q-V-S-L-T-C-L-V-K-G-F-Y-P-S-D-I-A-V-E-W-E-S-N-G-Q-P-E-N-N-Y-K-T-T-P-P-V-L-D-
S-D-G-S-F-F-L-Y-S-K-L-T-V-D-K-S-R-W-Q-Q-G-N-V-F-S-C-S-V-M-H-E-A-L-H-N-H-Y-T-Q-K-S-L-S-L-S-P-G-A-P-
T-S-S-S-T-K-K-T-Q-L-Q-L-E-H-L-L-D-L-Q-M-I-L-N-G-I-N-N-Y-K-N-P-K-L-T-R-M-L-T-F-K-F-Y-M-P-K-K-A-T-
E-L-K-H-L-Q-C-L-E-E-E-L-K-P-L-E-E-V-L-N-L-A-Q-S-K-N-F-H-L-R-P-R-D-L-I-S-N-I-N-V-I-V-L-E-L-K-G-S-E-T-T-
F-M-C-E-Y-A-D-E-T-A-T-I-V-E-F-L-N-R-W-I-T-F-C-Q-S-I-I-S-T-L-T (SEQ ID NO: 6)

FIG. 3B